

**CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006**

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Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	<ul style="list-style-type: none">• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at http://cdm.unfccc.int/Reference/Documents.
03	22 December 2006	<ul style="list-style-type: none">• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

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SECTION A. General description of small-scale project activity
A.1 Title of the small-scale project activity:

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Title: Greater Accra Improved Cookstoves

Version: 0.2

Date: 28/7/2011

A.2. Description of the small-scale project activity:

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Background to project

In Ghana, biomass contributes about 78% of the country's primary energy supply and is the predominant source of energy for households, commercial and small industries (FAO, 2002)¹. As a fuel for cooking, biomass is used by 83% of the population, with firewood being the predominant fuel in rural areas and charcoal in urban areas. The World Health Organization estimates that 75% of Ghanaian rural households cook with firewood, whereas 56% of urban households cook with charcoal². However, most households use firewood to some extent because wood fuel is used in the preparation of several traditional, indigenous Ghanaian dishes; it also supports many informal enterprises including bread-baking, processing oil-palm, local brewing, traditional textiles, traditional soap-making and fish-smoking.

With a population growth of 2.1% in 2008 (World Bank)³ and such a high demand for wood fuel it is easy to see why Ghana has a high annual deforestation rate of 1.8% (FAO, 2005)⁴. This situation is clearly unsustainable, which explains why the Government of Ghana has undertaken a Strategic National Energy Plan, supported by the Danish International Development Agency (DANIDA), to try and resolve this issue. In Ghana, around 2.2 million families are entirely dependent on wood for cooking and heating (FAO, 2002) and the traditional 3-stone fires used for cooking are only 10% efficient⁵. Therefore, increasing the efficiency of cooking practices represents an important opportunity to achieve a more sustainable energy outlook for Ghana.

In addition to the environmental consequences of a unsustainable local firewood supply (discussed later on), a poor quality of life is experienced by the rural poor using traditional wood stoves because they generate a large amount of smoke within the home. A WHO report concluded '*Indoor air pollution is a major environmental and public health hazard for many of the world's poorest, most vulnerable people.*' Biomass smoke has been linked to a range of health problems such as acute respiratory infections (ARI) in children, chronic obstructive lung diseases (such as chronic bronchitis and asthma), lung cancer and

¹ <http://www.fao.org/docrep/003/y3198e/Y3198E05.htm>

² <http://apps.who.int/ghodata/?vid=34000>

³ http://data.worldbank.org/data-catalog/world-development-indicators?cid=GPD_WDI

⁴ FAO 2005. Global Forest Resources Assessment. Country Reports. Ghana. Food and Agricultural Organization of the United Nations, Rome, Italy.

⁵ UNFCCC Methodology AMS-II-G

<http://cdm.unfccc.int/UserManagement/FileStorage/AUBHMWJVKFSY9D1380NOI5ET26ZQLG>

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pregnancy-related outcomes. It is estimated that 4-5% of global deaths occur as a result of exposure to smoke particulates,⁶ with the most recent WHO data estimating 6527 deaths per year from indoor air pollution in Ghana².

Project Purpose and Contribution to Sustainable Development

On an international level, the burning of significant quantities of non-renewable biomass also gives rise to large quantities of greenhouse gasses, contributing to anthropogenic climate change. The Greater Accra Improved Cook Stove project will construct approximately 2500 energy efficient domestic wood-burning cookstoves within the project area which will avoid an estimated 2600 tonnes of wood from being combusted per annum. Recipients will receive stoves free of charge and be directed in correct use of the stove by local community groups engaging with the project developers.

As our stoves will be given out for free, the project can expect to achieve high levels of saturation in an area, allowing as many households as possible to benefit from the improved stove. As the way in which a cook uses the stove is a key influencing factor in the fuel savings made,⁷ making improved stoves commonplace within a community will build a strong understanding of the technology and allow for greater fuel savings. This predicted benefit will be supported by proper training in stove usage and continuous liaison with the communities that own our stoves.

In addition to the global benefit of reducing greenhouse gas emissions, this project will deliver significant contributions to local sustainable development and toward achieving the Millennium Development Goals, including:

- Reduced deforestation and degradation of forests and associated impacts on biodiversity and ecosystem services
- Reduced soil erosion and nutrient loss
- Reduced risk of flooding
- Reduced poverty, as the efficient wood stove reduces annual expenditure on cooking fuels
- Reduced adverse health effects associated with indoor air pollution
- Reduced cooking and wood collection time; householders can spend more time on other household tasks, as well as schooling and supervising children
- Reduced exposure of firewood collectors (mainly women) to hazards in remote areas
- Reduced burns and injuries from cooking
- Increased rate of technology transfer

A detailed discussion of the impact of the project on sustainable development can be found in the accompanying Gold Standard Passport.

A.3. <u>Project participants:</u>
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⁶ “The health effects of indoor air pollution exposure in developing countries”, WHO, 2002 : http://whqlibdoc.who.int/hq/2002/WHO_SDE_OEH_02.05.pdf

⁷ Page 10 “Solid fuel household cook stoves: characterisation of performance and emissions”, Biomass and bioenergy 33 (2009) 294-305. http://www.pciaonline.org/files/Stoves_Paper_Final_Color_2.26.09.pdf

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Name of Party involved (*) (host) indicates a host Party)	Private entity project participants	Kindly indicate if the Party involved wishes to be considered as a project participant (Yes/No)
Ghana (host)	N/A	No
United Kingdom	co2balance UK	No

The project is voluntary and as such official endorsement from the Parties is not required, the Ghanaian DNA, The Environmental Protection Agency (EPA) is however, aware of the project. A representative of the EPA was invited to the local stakeholder’s meeting and also engaged to confirm the EIA non-requirement status of the project. A decision of the non-EIA requirement is currently with the Environmental Protection Agency (EPA) of Ghana.

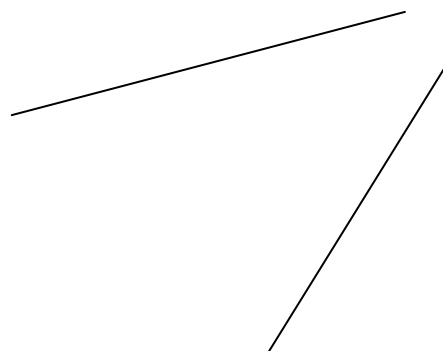
A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

>>The project activity will take place in the Republic of Ghana

A.4.1.1. Host Party(ies):

>> The Republic of Ghana



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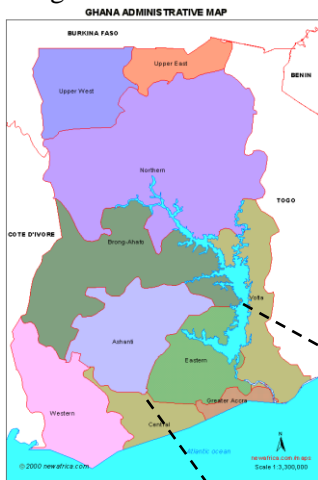


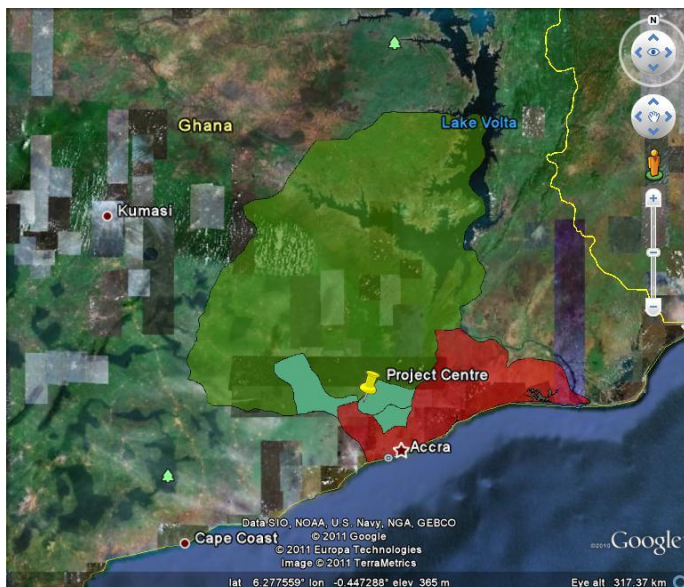
A.4.1.2. Region/State/Province etc.:

>> The activities will take place within three districts in Ghana; Ga East in the Greater Accra region and West Akim and Akuapin South in the Eastern Region.

A.4.1.3. City/Town/Community etc:

>> The region colours shown on the inset map are matched on the GoogleEarth image, showing the exact location of the three districts. A point showing the project centre is shown and has a GPS reference of Longitude: 5.794132° Latitude: -0.377005°





A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

>> The GPS co-ordinates of each stove constructed will be recorded and tracked using an electronic database to ensure that they fall within the specified boundary based on political districts in Ghana.⁸ Each stove is marked with a unique identification number that will be uploaded and kept on our electronic database, including household occupants and GPS co-ordinates. This database does not allow duplicate records to be uploaded and hence accounts for any potential human error in reporting ID numbers and GPS data. This will allow transparent, individual tracking of each stove - avoiding double counting and administrative error.

Each household will be given the option of having the stove fixed within the home or in a covered cooking location outside - alternatively, stoves will not be fixed in one place. At the request of the household co2balance will prepare a safe level area inside and outside the home to allow stove position to be changed depending on the season. An unfixed stove is susceptible to damage and theft, and if a significant number of stoves are lost from within the project boundary this option will be reviewed.

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

>> The project falls under the Energy Efficiency – Domestic (Improved Distributed Heating and Cooking Devices category) according to the GSV2.1 toolkit annex C.

⁸ Note: Political Boundaries are subject to change within Ghana, as a result of our experiences in project development, every effort has been made to define a project boundary that has relevance and tangibility for all local stakeholders and employees. In our judgement, the best way to do this was via political boundaries delineating districts, the smallest political division in Ghana.

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The project technology of the generic ‘rocket stove’ type is well proven to be environmentally safe and sound in relation to the baseline ‘three-stone’ technology.⁹ The rocket stove technology will be distributed to a number of households within the project area and households trained in efficient use of the stoves to ensure successful transfer of this technology type to the area in question.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Year	Estimation of annual emissions reductions in tonnes CO ₂ e
2012	2475
2013	5000
2014	5000
2015	5000
2016	5000
2017	5000
2018	5000
2019	2474
Total estimated reductions (tonnes CO₂e)	34962
Total number of crediting years	7
Annual average of the estimated reductions over the crediting period	4994

A.4.4. Public funding of the small-scale project activity:

>> There is no public or ODA funding for this project activity, all revenue for the project will be derived from the sales of VERs. Please see annex 1 in the passport document of this project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

In accordance with the guidelines recorded in EB54, Annex 13, paragraph 7, the proposed small-scale project activity is exempted from undergoing a de-bundling check.

⁹ MacCarty, N., Ogle, D., Still, D., Bond, T. & Roden, C., (2008). ‘A laboratory comparison of the global warming impact of five major types of biomass cooking stoves’, *Energy for Sustainable Development* 12 (2), pp. 5-14. Accessed from <http://www.aprovecho.org/lab/pubs/researchlib/category/20/performance-studies>

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Refer to Excel file ‘PDD Supplementary Data Greater Accra for calculations.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

>> The micro-scale project activity falls within the Gold Standard Methodology ‘*Technologies and Practices to Displace Decentralized Thermal Energy Consumption*’ Version 1. This was the most up to date methodology at the time of submission.

Additionality is demonstrated using the UNFCCC Tool for the demonstration and assessment of additionality (Version 05.2) which shows that the project would not be possible without VER revenues.

B.2 Justification of the choice of the project category:

>> The project will be classified as micro-scale in accordance with the Gold Standard rules. Micro-scale energy efficiency projects are defined by the Gold Standard/CDM EB as reducing less than 5000 tonnes of CO₂e per year. Details of these calculations are available at validation in the supplementary information excel file sent with this PDD.

The justification of the choice of the methodology is addressed in sections below to show that it is fully applicable the proposed project activity. Sections in *italics* represent the criteria specified by the methodology in Section B.1 above; body text indicates the response of the project proponent.

1. ‘The project boundary can be clearly identified, and the technologies counted in the project are not included in another voluntary market or CDM project activity

The project boundary has been clearly demarcated using political divisions recognised in Ghana. The stoves counted are individually marked with a project specific identification code that is referenced in all records relating to the stove, stored in the project proponent’s database. This ensures that the stoves are not accidentally counted in other project activities by the project proponent. Kitchen Surveys will be used to eliminate the potential for double counting from other voluntary market or CDM activity within the project area.

2. Technologies have a continuous useful energy output of less than 150kW per unit (defined as total energy delivered usefully from start to end of operation of a unit divided by time of operation). For technologies or practices that do not deliver thermal energy in the project scenario but only displace thermal energy supplied in the baseline scenario, the 150kW threshold applies to the displaced baseline technology.

As this project technology primarily delivers thermal energy (some displacement will occur as a result of improved cooking practices), the 150kW threshold does not apply to the baseline technology. A single stove only will be introduced into each kitchen counted by the proposed project activity. Using the

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results of the baseline study, the continuous useful energy output delivered has been estimated at 2.47kW¹⁰, which is well within the limit imposed by the methodology of 150kW.

3. The use of the baseline technology as a backup or auxiliary technology in parallel with the improved technology introduced by the project activity is permitted as long as a mechanism is put into place to encourage the removal of the old technology and the definitive discontinuity of its use.

As referenced in the methodology ‘the removal and continued non-use of three stone fires and other easily constructed traditional devices (the baseline technology replaced by this project activity) is in many cases unlikely and impractical to monitor¹¹.’ We therefore do not plan to offer any incentive to encourage removal of traditional devices. It is hoped that the positive benefits our stove offers for local people will act as the incentive for discontinuity of traditional device use.

a) The project documentation must provide a clear description of the approach chosen and the monitoring plan must allow for a good understanding of the extent to which the baseline technology is still in use after the introduction of the improved technology, whether the existing baseline technology is not surrendered at the time of the introduction of the improved technology, or whether a new baseline technology is acquired and put to use by targeted end users during the project crediting period.

Overall use of the baseline technology will be monitored in conjunction with that of the project technology, as will the emergence of any other baseline technology by targeted end users. This information will also ensure that requirement 1 (above) of the methodology is also met.

b) ‘The success of the mechanism put into place must therefore be monitored, and the approach must be adjusted if proven unsuccessful. If an old technology remains in use in parallel with the improved technology, corresponding emissions must of course be accounted for as part of the project emissions.’

Parallel baseline technology use (viz three stone fires or traditional equivalent) will be revealed during monitoring and its effect on emissions reductions be captured using the equation 6 of the methodology $B_{p,y} = N_{p,y} * ((P_{p,y} * U_{p,y}) + (P_{b,y} * (1 - U_{p,y})))$. The uptake rate U will be determined by surveys and hence used to account for parallel baseline and project technology use.

4. The project proponent must clearly communicate to all project participants the entity that is claiming ownership rights of and selling the emission reductions resulting from the project activity. This must be communicated to the technology producers and the retailers of the improved technology or the renewable fuel in use in the project situation by contract or clear written assertions in the transaction paperwork. If the claimants are not the project technology end users, the end users should be notified that they cannot claim for emission reductions from the project

A full explanation will be given to all household stove recipients, or end users, that co2balance have provided them with a stove for free on the basis that the emissions reductions will be transferred to co2balance. This will be recorded using a Carbon Rights Form, which stove owners will sign to confirm they understand and voluntarily enter the agreement in which they cannot claim emissions reductions from the project.

¹⁰ See Supplementary Data Sheet Greater Accra

¹¹ http://www.cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/manuals_and_methodologies/110411_TPDDTEC_Methodology.pdf p4

5. Project activities making use of a new biomass feedstock in the project situation (e.g. shift from non-renewable to green charcoal, plant oil or renewable biomass briquettes) must comply with relevant Gold Standard specific requirements for biomass related project activities, as defined in the latest version of the Gold Standard rules.

As the technology used in this project has been specifically designed to make use of baseline feedstock viz fuelwood, rather than a new biomass feedstock, this criterion is not applicable to this project. The emission reductions from this project will result from a change in quantity of fuel *consumed*, rather than change of fuel *type*.

B.3. Description of the project boundary:

>> The project boundary is specified in the methodology as follows:

a) *The project boundary is the physical, geographical sites of the project technologies and potentially of the baseline and project fuel collection and production (e.g. charcoal, plant oil), as well as solid waste and effluents disposal or treatment facilities associated with fuel processing.*

The project boundary is therefore defined as the domestic kitchens in which each project technology is installed. Each stove is GPS tagged and individually identified by a reference number ensuring that project technologies are easily distinguishable.

b) *The target area is defined by the regions or towns within a single country, or across multiple adjacent countries, where the considered baseline scenario(s) is(are) assessed to be uniform across political borders. The target area provides an outer limit to the project boundary in which the project has a target population.*

The target area is defined by the image in A3.1.2

c) *In cases where woody biomass (including charcoal) is the baseline fuel, the fuel production and collection area is the area within which this woody biomass can reasonably be expected to be produced, collected and supplied.*

The fuel production and collection area has been defined by Kitchen Surveys which show that the majority of households collect their fuel from the local area on foot.

Emission sources within the project boundary

Greenhouse gasses included in the project and baseline scenarios are tabulated below.

	Source	Gas	Included?	Justification/Explanation
Baseline	Cooking, production of fuel, and transport of	CO ₂	Yes	Important source of emissions
		CH ₄	Yes	Important source of emissions

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	fuel	N ₂ O	Yes	Can be significant in some fuels
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	Source	Gas	Included?	Justification/Explanation
Project	Cooking, production of fuel, and transport of fuel	CO ₂	Yes	Important source of emissions
		CH ₄	Yes	Important source of emissions
		N ₂ O	Yes	Can be significant in some fuels

B.4. Description of baseline and its development:

>> A. Baseline Non-Renewable Biomass Assessment

The baseline Non renewable biomass assessment was conducted by an independent consultant C4Eco Solutions based in South Africa. Approach A1.3 - similar to the approach of CDM AMS-II.G - was followed (refer to attached co2balance fNRB report). All variables, data sources and parameters used to determine the baseline are listed in the report.

B. Baseline Survey

Personal interviews, or Kitchen Surveys, were carried out in February as directed by the independent consultant KPMG and as described in the baseline report. A representative sample size of targeted end users was interviewed to capture the following demographic, cooking preference and fuel choice variables:

- Their address and telephone number (mobile or landline where possible)
- The number of people served by the baseline technology and typical usage patterns and tasks (e.g. domestic/commercial cooking)
- The types and estimated frequency of baseline technologies used and estimated frequency
- The types of fuels used and estimated quantities
- Seasonal variations in baseline technology and fuel use
- Sources of fuels and prices paid (if purchase is the source) or effort made (if collection is the source)
- Woody biomass renewability and non renewability indicators as indicated in Annex 1 of the methodology

The information from the baseline survey was used to choose the most representative households in terms of the above stated variables for the baseline performance test. This process was carried out by an independent consultant.

C. Baseline Performance Field Test

The baseline performance field test follows the guidance in annex 4 of the methodology – the Kitchen Performance Test. The Kitchen performance test was used to measure a range of targeted end user wood

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use from which a statistically confident estimate of the mean was taken. An appropriate time of year to conduct the KPT to ensure a conservative result was advised by an independent consultant.

The key variables that were measured during the KPT and used in producing a confident estimate of the mean baseline wood use (in conjunction with the variables in baseline survey listed above) were:

Variable	Unit	Source
Children age 0 – 14 years	-	Household KPT Survey
Females over 14 years	-	Household KPT Survey
Males 15 – 59 years	-	Household KPT Survey
Males over 59 years	-	Household KPT Survey
Weight of wood used in 24hrs	Kg	Weight of used wood during Household KPT Survey (over 4 days)

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

There has not been any previous announcement that the project activity would go ahead without emissions reductions credits earned under the Gold Standard. The project activity is financed upfront based on the projected revenues from future Gold Standard VERs as the sole source of funding; therefore the project activity could not go ahead without the prospect of VER credits.

Additionality is demonstrated using the UNFCCC Tool for the demonstration and assessment of additionality (Version 05.2) which shows that the project would not be possible without VER revenues.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations.

Sub-step 1a: define alternatives to the project activity:

Alternative 1: Stoves are designed, marketed, built and distributed by a stove builder without registering as a Gold Standard VER project.

Under this alternative scenario the project would proceed as laid out in this document. This would provide the same energy output, result in the biomass savings, improved livelihoods and other contributions to sustainable development identified.

Alternative 2: Continuation of the current situation – use of traditional cooking with 3-stone fireplaces.

Without the intervention of the project and use of carbon finance it is unlikely that the status quo will change.

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Outcome of sub-step 1a: Two realistic and credible alternatives to the project activity have been identified.

Sub-step 1b: Consistency with mandatory laws and regulatory

The alternatives identified in Sub-step 1a above are in compliance with the mandatory laws and regulations in Ghana.

Outcome of sub-step 1b: Two realistic and credible alternative scenarios to the project activity that are in compliance with mandatory legislation and regulations taking into account the enforcement in the region and EB decisions on national and/or sectoral policies and regulations have been identified.

Step 2: Investment Analysis

Sub-step 2a: Determine appropriate analysis method

As the proposed project activity generates no financial or economic benefits other than the VER revenues, the simple cost analysis (option I) will be applied, as suggested by the additionality tool.

Sub-step 2b: Option I. Apply simple cost analysis

The costs associated with the proposed activity and alternatives identified in Step 1 are documented here which will demonstrate that at least one alternative is less costly than the proposed activity.

Proposed activity

Despite the development of a number of improved stoves within Ghana over the last 20 years, there has been very low penetration of the technology in rural wood-burning households, as the technologies have focussed on charcoal as the fuel source. (referenced in barrier analysis). The rocket-stove cost price is €33 (breakdown cost is shown below; supporting evidence available to DOE).

Material	Qty	Unit Cost (€)	Total (€)
Side Walls	2	€ 1.60	€ 3.20
Liner	1	€ 1.52	€ 1.52
Metal Plate	1	€ 2.32	€ 2.32
Liner	1	€ 1.36	€ 1.36
Side Skirts	2	€ 0.52	€ 1.04
Shelf	1	€ 0.64	€ 0.64
Pot Plate	1	€ 2.64	€ 2.64
Assembly Cost	1	€ 3.04	€ 3.04
Subtotal	1	€ 0.00	€ 15.76
Direct Costs (inc VAT 16%)			€ 18.28
Indirect Costs			€ 14.28
Total (€)			€ 33

In line with the estimated distribution potential of 2258 improved cook stoves in the defined project area, this would require funding of €73,524. In this scenario a proposed total of 33976 will be issued to the proponent over the first 7 years of the project (after GS deductions). Retailing the VERs at €8 each

would provide a surplus of €198,281 sufficient to cover the additional burden of putting the project through the Gold Standard as well as making the project an investment opportunity for financiers.

Alternative 1

Under this alternative scenario the project would be implemented as per the proposed activity and thus would incur the same build costs of €73,524. However, without registration through the Gold Standard or other carbon financing mechanism this would have to be funded in another manner, either by sales or charitable donations.

This alternative is likely to be more costly than the proposed activity.

Alternative 2

There are no costs associated with the continuation of cooking on a 3 stone fire, thus this alternative is clearly less costly than the proposed activity.

It is concluded that the proposed activity is more costly than at least one alternative (Alternative 2), so the assessment can proceed to Step 4 (Common practice analysis). The proponent has opted to apply Step 3: Barrier Analysis also.

Step 3: Barrier Analysis

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed GS VER project activity:

(a) Investment barriers

Government funding

This is discussed in step 4 below.

Private funding

The real or perceived risk associated with investment in Ghana is high. There are examples of micro-scale as well as large-scale implementations of fuel-efficient cooking stove projects in Ghana. These projects have all received either grant/donor funding, or have attracted carbon finance through the voluntary carbon market, particularly under the Gold Standard scheme. The investment barrier for these projects is the same as for the proposed project.

Though the country is doing better than a couple of decades ago the statistics show that the political and economic environment is not ideal for foreign investment. In recognition to such an improvement the Organisation of Economic cooperation and Development (OECD) revised in 2005 Ghana's credit risk assessment upgrading it from band 7 to band 6. The country's sovereign credit ratings measured by Fitch were also upgraded from the B position to B+ whilst the Standard and Poors maintained the B+ rating. A credit rating of 'B' is five levels below the top investment grade and just above the "vulnerable and dependent on favourable economic conditions to meet its commitments" level.¹²

¹² <http://www.afrika.no/Detailed/10257.html>

Finally, a study by the World Bank found that 68.77% of small business in Ghana identified access to finance as a major business constraint, ranking this as the second largest obstacle, 90.28% of small businesses rely on internal funding/returns for investment.¹³ The up-front costs required to develop and market efficient cook stoves would be significant, and until a reduction in costs could be proven, there would be no market. Given this financial case, for such a business it is unlikely that a source of funding could be found.

In summary, there is no or insufficient private capital due to the actual or perceived risk of conducting business in the host country, Ghana.

(b) Technological barriers *Inter alia*

Although the *generic* ‘rocket stove’ technology is not new, significant funding has been required to overcome the numerous technological barriers to implementation of the specific technology. Investment is required in: researching, developing and testing the design; financing construction materials; transportation of materials; education programme, amongst other things.

Skilled labour: In addition there is a lack of an adequately trained local workforce capable of constructing and maintaining stoves at present, specific training in construction is required for the technology to be utilised. There is no clear development of a market that would drive such capacity to be built due to the financial barriers stated above.

(c) Barriers due to prevailing practice *inter alia*

Habitual use of traditional stoves imposes a very strong influence on the baseline scenario, resulting in continuation of use of traditional three stone fires. There have been some efforts to introduce improved cook-stoves in Ghana but, as for many other countries, mainly limited to urban dwelling charcoal users as implementation is always easier than in rural communities. Households in rural Ghana do not have access to the market to obtain information about the existence and effectiveness of fuel-efficient cooking stoves. The proposed project will see the widespread education of households to the benefits of using the stoves: wood fuel savings, reduction in indoor smoke pollution, reduced wood collection time etc.

(d) Financial barriers

d.1 Lack of Household Income

According to the International Fund for Agricultural Development (IFAD) 28.5% (2007 est.) of Ghana’s rural population live below the poverty line.² The gross national income per capita in 2008 was \$698.2¹⁴

¹³ <http://www.enterprisesurveys.org/CustomQuery/country.aspx?economyid=76&year=2007&characteristic=size>

¹⁴ <http://data.un.org/CountryProfile.aspx?crName=Ghana>

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and for the rural poor 75% of the household budget is spent on food¹⁵. Another study found that specifically the average annual household income in Ghana is about 1,217.00 GHS.¹⁶

In terms of consumption, households are major consumers of wood fuel in Ghana; little wood fuel is consumed by the commercial and industrial sectors. All income groups use wood fuel because the use of LPG, kerosene and electricity for cooking requires relatively higher capital, their supply and distribution are unreliable and charcoal and fuel wood can be bought in small quantities at a time and are suitable for the preparation of indigenous Ghanaian dishes.¹⁷

Calculations have been made to assess the ability of households in the target area to purchase a Carbonzero Stove at the cost price of 69GHC based on the data tabulated in the table below:

Household cash flow available

Household Income	
Average income (GHC /year)	1529
Average income (GHC /month)	127
Household expenses	
Proportion of income spent on food (%)	75%
Annual Income remaining after food	382
Monthly Income remaining after food	32
Cost of Carbonzero Stove	69
Stove as % of remaining annual income (conservatively assuming no fuel is purchased)	18%
Stove as % of remaining monthly income (conservatively assuming no fuel is purchased)	-216%

Therefore, the remaining annual household cash available after the basic food and fuel expenditure will be 382 GHC. This is the most conservative scenario possible for an average Ghanaian family. The significance of purchasing the improved stove at the cost noted above with respect to the remaining household cash represent about the 18% of the annual savings. Note this does not take into account any of the other costs of living such as clothing and schooling, it seems most likely then that the majority of households would not be able to independently purchase an efficient stove. This situation is reinforced if the cost of the Carbonzero is considered as a percentage of the monthly income which clearly shows the stove is beyond the reach of ordinary rural citizens. Furthermore, the project will be promoted in rural and disadvantaged areas where population remain far from the national average statistics showed in this report. Therefore, and as indicated by the World Bank research, country conditions suggest that the purchase of the stove is unaffordable to the majority of Ghanaians, accounting

¹⁵ <http://www.ifad.org/gender/learning/household/46.htm>

¹⁶ http://www.statsghana.gov.gh/docfiles/gls5_report.pdf N.B. earlier references on page 16 to annual income were specific to Greater Accra and the Eastern Region

¹⁷ <http://www.fao.org/docrep/003/y3198e/Y3198E05.htm>

for several percent of annual incomes, particularly from the targeted communities approached by the project.

d.2 Lack of financial incentive

Rural households that collect local wood to use as cooking fuel have no financial incentive to invest in a cooking stove, even if they could set aside enough household income to afford one. For these households the costs of cooking with an inefficient stove are externalized so there is no motivation to purchase an efficient stove even if one was available via the market *and* affordable.

It is universally acknowledged that wood fuel use in Ghana is associated primarily with rural populations and that the wood fuel under these conditions is not normally bought but collected.¹⁸ As rural populations, by definition, are the target population for this improved woodfuel cookstoves programme, it is clear the lack of financial incentive is applicable to each stove recipient.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)

None of the identified barriers discussed above prevent alternative 2, continuation of cooking on three stone fires, from occurring.

“If both Sub-steps 3a – 3b are satisfied, proceed to Step 4 (Common practice analysis)”.

Step4: Common practice analysis

Substep 4a: Analyse other activities similar to the proposed project activity

Market-based efforts to introduce Improved Cookstoves (ICS) into Ghana at scale have been largely non-existent; hence, the two major projects that have so-far attempted to introduce ICS technology have relied on subsidies or other financial support. A brief analysis of the two previous charcoal ICS projects in Ghana illustrates the problems of obtaining sufficient and consistent funding that are applicable to all stove projects, regardless of fuel type.

¹⁸ <http://www.nrbp.org/papers/046.pdf>

Ahibenso Stove

Source: <http://www.afrepren.org/pictures.htm>

ICS projects in Ghana began in 1989 with the development, by the Ghanaian Ministry of Mines and Energy of the Ahibenso stove (pictured above). Stove production began in earnest in 1991 and in order to establish the stove as a reliable, quality product, it was initially manufactured by one company (Alfa Manufacturing) with a monopoly on construction and design¹⁹. In an attempt to break the monopoly model, funding from the UNDP in 1992 was used to train local artisans and firms throughout the country to produce and diversify the Ahibenso stove. However, the high quality of the original stoves produced by Alfa meant that retailers were less willing to sell stoves produced by artisans. As a result, prices of original stoves increased dramatically whilst demand for artisanal stoves never developed, which meant that the technology was fundamentally unable to achieve significant scale or financial sustainability.²⁰ (Stosch & Quaye, 2002).

¹⁹ <http://www.hedon.info/AhibensoStove&highlight=ahibenso>

²⁰ Stosch, Lisa and Wilhemina Quaye, *A Study of Fuel Consumption in Three Types of Household Charcoal Stoves in Ghana*. Accra, Ghana. December, 2002

Gyapa Stove

Source: <http://www.hedon.info/cleanenergyforhouseholdcookingghana>

EWV (Enterprise Works/ViTA – Volunteers in Technical Assistance) began introducing and promoting the Gyapa (meaning ‘Good Fire’) stove in 2002 with funding from USAID and the Shell foundation. The early financial assistance was provided on the basis that it would offer sufficient impetus to the project that it could become self-sustaining and ensure successful donor pull-out. However, when funding and support by EWV was withdrawn, issues in quality control²¹ became apparent and customer confidence suffered, with a resultant 40% drop in sales in the two years that followed.

Two grants issued in 2004 and 2007 were issued to try and improve sales, however this finance had the unanticipated effect of exacerbating the quality control problem. In seeking to increase market penetration and therefore profitability, the finance centred on ramping-up production throughout the country, which spread the quality control resources even more thinly. In short, the funding was insufficient compared to the substantial costs involved in a systemic transformation of the market i.e. one that was able to simultaneously address issues such as advertising, promotion & quality control - as well as production.

With this in mind, EWV tried to secure more substantial, long-term development finance from the World Bank, GEF and DFID, but unfortunately with no success. Sustained funding only became a realistic possibility via carbon finance (ClimateCare) in 2007 and, using an advance based on project revenues, EWV were able to return to their role and address quality issues to rebuild customer confidence in the Gyapa stove.

Sub-step 4b: Discuss any similar Options that are occurring:

²¹ EWV provided training for manufacturers and artisans, as well as guidance on quality control. Following their departure from this role, manufacturers began cutting corners e.g. altering cladding design or using inappropriate ceramics for the stove liner, which drastically reduced the durability and longevity of the stoves.

As the lessons from previous project failures illustrate (4a), the introduction and widespread adoption of similar stoves to that proposed in this project require substantial and sustained funding. Interestingly, some of the artisans originally involved in building the Gyapa stove have designed a new stove under the auspices of Toyola Energy Limited (TEL). The Toyola CoalPot is largely based on the original Gyapa design, but has a number of differences such that it can be considered a new product. It is revealing that TEL and their partner E+Carbon are now seeking carbon finance for the rollout and commercialisation of their product. Revenue from carbon finance is evidently emerging as a legitimate way of supplying the initial - and crucially the continued - investment required to change prevailing practice and deliver a successful stove project. It is therefore concluded that the project is additional.

B.6. Emission reductions:

Application of methodological procedures:

The project proponent has opted to carry out a single sample test of baseline fuel use and use an independently verified assessment of the thermal efficiency of the improved project stove in estimating the project scenario and hence emission reductions. The procedures used are described below:

Procedures used to calculate baseline emissions:

The non renewable biomass fraction was calculated according to substep A1.3 provided by the methodology (that similar to that of CDM AMS II G). This study was carried out by an independent consultant. A baseline survey was used to assess target population characteristics of randomly selected households using traditional 3 stone fires. Of those interviewed, the most representative end users (by demographic indicators and cooking preferences) was selected for the baseline KPT study using statistical analysis by an independent consultant for transparency.

The standard approach to a Kitchen Performance Test listed in the methodology was followed and KPTs were conducted during the rainy season on the advice of an independent consultant to ensure a conservative result. The results of the KPT were then statistically analysed according to the 90/10 rule to determine a representative figure for baseline emissions, unfortunately the coefficient of variance for a sample size of 43 was too small therefore the lower bound of confidence of 90% was used.

Procedures used to calculate the project emissions:

An independent laboratory test of the thermal efficiency of the project technology was used to estimate the project fuel use in relation to the baseline technology. A default efficiency of 10% of the baseline technology was applied in accordance with the rules of the methodology. Measured baseline fuel use from the statistically representative KPT studies (shown in the prior section) was used to predict savings as a result of the improvement in efficiency of the project technology. These calculations were carried out by an independent consultant and are made available for validation.

The proponent will carry out KPTs for the project scenario in time for verification; project tests will be independent of the baseline tests. This option allows a proper development of the project and hence accurate assessment of emissions reductions - this process is fully described in the monitoring plan.

Procedures used to calculate leakage:

Leakage within this project will only occur during the construction phase of the project, the first crediting year, but will be monitored biennially. The potential for leakage from other sources will be monitored during the project. An assessment of the emissions factors for each stove component was carried out using independent, recognised sources and used to calculate the total emissions per

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manufactured stove. The transport emissions of the fully constructed stoves, including embodied emissions of materials, were calculated using conservative estimates (i.e. overestimates) of distances travelled. The detail of these calculations is supplied in the accompanying excel spreadsheet.

Equations used in estimated emissions reductions:

Baseline Emissions

$$BE_{b,y} = B_{b,y} * \left((fNRB_y * EF_{b,fuel,CO2}) + EF_{b,fuel,nonCO2} \right) * NCV_{b,fuel} \quad (\text{equation 3})$$

Where:

$$B_{b,y} = N_{p,y} * P_{p,y} \quad (\text{equation 4})$$

Project Emissions

$$PE_{p,y} = B_{p,y} * \left((fNRB_y * EF_{p,fuel,CO2}) + EF_{p,fuel,nonCO2} \right) * NCV_{p,fuel} \quad (\text{equation 5})$$

$$\text{Where: } B_{p,y} = N_{p,y} * ((P_{p,y} * U_{p,y}) + (P_{b,y} * (1 - U_{p,y}))) \quad (\text{equation 6})$$

In which $P_{p,y} = B_{b,y} * (\eta_{Baseline} / \eta_{Project})$

Where η is the thermal efficiency of the device in either scenario (using equation 3 derived from AMS II.G, option 2).²²

Overall Emissions

$$ER_y = \Sigma BE_{b,y} - \Sigma PE_{p,y} - \Sigma LE_{p,y} \quad (\text{equation 7})$$

B.5.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	EF _{b,CO2}
Data unit:	tCO ₂ /TJ
Description:	CO ₂ emission factor arising from use of wood-fuel in baseline scenario (includes production, transport and use)
Source of data used:	Calculated from IPCC defaults
Value applied:	112
Justification of the choice of data or description of	Deemed valid by methodology.

²² <http://cdm.unfccc.int/methodologies/DB/6U8JYO9XTLVZ8LJ7GUBSZP145BIDG2/view.html>

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measurement methods and procedures actually applied :	
Any comment:	Details of calculations available to validator.

Data / Parameter:	EF _{b,CH4}
Data unit:	tCO ₂ /TJ
Description:	CO ₂ emission factor arising from use of wood-fuel in baseline scenario (includes production, transport and use)
Source of data used:	Calculated from IPCC defaults
Value applied:	0.63
Justification of the choice of data or description of measurement methods and procedures actually applied :	Deemed valid by methodology.
Any comment:	Details of calculations available to validator.

Data / Parameter:	EF _{b,N2O}
Data unit:	tCO ₂ /TJ
Description:	CO ₂ emission factor arising from use of wood-fuel in baseline scenario (includes production, transport and use)
Source of data used:	Calculated from IPCC defaults
Value applied:	1.24
Justification of the choice of data or description of measurement methods and procedures actually applied :	Deemed valid by methodology.
Any comment:	Details of calculations available to validator.

Data / Parameter:	EF _{p,CO2}
Data unit:	tCO ₂ /TJ
Description:	CO ₂ emission factor arising from use of wood-fuel in Project scenario (includes production, transport and use)
Source of data used:	Calculated from IPCC defaults
Value applied:	112
Justification of the choice of data or description of measurement methods and procedures actually applied :	Deemed valid by methodology.

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Any comment:	Details of calculations available to validator.
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Data / Parameter:	EF _{p,CH4}
Data unit:	tCO ₂ /TJ
Description:	CO ₂ emission factor arising from use of wood-fuel in Project scenario (includes production, transport and use)
Source of data used:	Calculated from IPCC defaults
Value applied:	0.63
Justification of the choice of data or description of measurement methods and procedures actually applied :	Deemed valid by methodology.
Any comment:	Details of calculations available to validator.

Data / Parameter:	EF _{p,N2O}
Data unit:	tCO ₂ /TJ
Description:	CO ₂ emission factor arising from use of wood-fuel in Project scenario (includes production, transport and use)
Source of data used:	Calculated from IPCC defaults
Value applied:	1.24
Justification of the choice of data or description of measurement methods and procedures actually applied :	Deemed valid by methodology.
Any comment:	Details of calculations available to validator.

Data / Parameter:	NCV _b
Data unit:	TJ/ton
Description:	Net calorific value of the fuels used in the baseline
Source of data used:	IPCC defaults
Value applied:	0.0156
Justification of the choice of data or description of measurement methods and procedures actually applied :	Deemed valid by methodology.
Any comment:	Details of calculations available to validator.

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Data / Parameter:	NCV _b
Data unit:	TJ/ton
Description:	Net calorific value of the fuels used in the Project
Source of data used:	IPCC defaults
Value applied:	0.0156
Justification of the choice of data or description of measurement methods and procedures actually applied :	Deemed valid by methodology.
Any comment:	Details of calculations available to validator.

Data / Parameter:	fNRB
Data unit:	Non Renewability Fraction
Description:	Non-renewability status of woody biomass fuel in scenario i during year y
Source of data used:	Independent study (C4Ecosolutions)
Value applied:	1
Justification of the choice of data or description of measurement methods and procedures actually applied :	Approach A1.1 Quantitative NRB assessment was used in accordance with the methodology
Any comment:	Details of calculations available to validator.

B.6.3 Ex-ante calculation of emission reductions:

>> All the calculations performed in this section are further developed and available in the supplementary excel info sheet sent with this document.

Equations 3,4,5,6,& 7 were applied as shown in B6.

As discussed in section B.6 and the attached report, the results of the KPT were analysed to provide the average fuel saving per stove per year to the lower bound of 90% confidence interval. This was then used to calculate the ex-ante emissions reductions per stove-year.

	kg/HH/day	
Firewood Consumption 3-stone stove	5.52	>> All data, including rounded.
Saving Adj for lower bound of 90% confidence	4.80	>> All data, including rounded.

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Therefore,

	t/HH/year
Firewood Consumption 3-stone stove	2.01
Saving Adj for lower bound of 90% confidence	1.75

>> from the baseline monitoring report by third party.

The figure adjusted for 90% confidence was used to work out the tonnes used per stove per day and the estimated tonnes saved per stove $P(b,y - p,y)$ T/HH/yr were calculated using the relative improvement in efficiency of the CarbonZero stove. This ratio is the old thermal efficiency divided by the new thermal efficiency – similar to the equation used in AMS IIG (equation 6 in B6.1).

$P(b,y)$ T/HH/day	0.00480
$P(p,y)$ T/HH/day	0.001384
$P(b,y - p,y)$ T/HH/yr	1.246664

This figure was multiplied by the number of project technology days (the number of stoves multiplied by days – an uptake rate of 1 was assumed for simplicity) to determine the predicted wood saved as a result of the project.

$N(p,y)$ stoves*days	824170
$B(b,y - p,y)$	2814.967

In line with the methodology this was multiplied by the emissions factors for co2 (incorporating the non-renewability fraction of 1), methane and nitrogen dioxide and the Net Calorific Value for wood (0.0156) to give the emissions reduction before leakage.

NRB (b,y)	1
EF CO2 (b, wood tco2/t)	112
EF CH4 (b, wood tco2/t)	0.63
EF N2O (b, wood tco2/t)	1.24
NCV (b, wood)	0.0156

Hence: $2814 * 1.71$ (all emission factors plus NCV) =

ER_{2,3,...} (tCO₂e/year)	5000
---	-------------

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Leakage per stove has been assessed as one-off source identified that will be written off in the first crediting year following stove construction, following this zero leakage is anticipated. Leakage per stove (footprint in tCO₂e) was multiplied by the number of stoves to give the total project leakage

Footprint /tCO₂e	0.0228
N,y	2258

Hence: $0.0228 \times 2258 = 51.49$ tCO₂

B.6.4 Summary of the ex-ante estimation of emission reductions:

>> Estimated to be 2169 tCO₂e in the first year and limited to 5000tCO₂e in subsequent years for the duration of the crediting period, with 6 months credits in the final vintage.

Year	PE - Estimation of project activity emissions (tCO ₂ e)	BE - Estimation of baseline emissions (tCO ₂ e)	LE - Estimation of leakage (tCO ₂ e)	ER - Estimation of overall emission reductions (tCO ₂ e)
2012	-	-	51	2,169
2013	-	-	0	5,000
2014	-	-	0	5,000
2015	-	-	0	5,000
2016	-	-	0	5,000
2017	-	-	0	5,000
2018	-	-	0	5,000
2019	-	-	0	2,500
Total (tCO₂e)	-	-	0	34,669

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.6.1 Data and parameters monitored:

(Copy this table for each data and parameter)

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Data / Parameter:	$f_{NRB,i,y}$
Data unit:	Fractional non-renewability
Description:	Non-renewability status of woody biomass fuel in scenario i during year y
Source of data to be used:	Applicable NRB assessment
Value of data	1.0
Description of measurement methods and procedures to be applied, inc. frequency:	Quarterly Monitoring Kitchen Survey will determine any change in the indicators of non-renewability as described in the methodology
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	$P_{b,y}$
Data unit:	kg/household-day
Description:	Quantity of fuel that is consumed in baseline scenario b during year y
Source of data to be used:	Baseline FT, baseline FT updates, and any applicable adjustment factors
Value of data	4.8
Description of measurement methods and procedures to be applied, inc. frequency:	Baseline FT Updated minimum every two years over project lifetime. Seasonality of wood fuel use will be assessed by quarterly baseline FTs during monitoring.
QA/QC procedures to be applied:	Additional FT will be carried out prior to verification to see if seasonality of wood use is significantly present in Ghana
Any comment:	Baseline levels of Ghanaian wood use may be seasonal

Data / Parameter:	$P_{p,y}$
Data unit:	kg/household-day
Description:	Quantity of fuel that is consumed in project scenario p during year y
Source of data to be used:	Project FT, Project FT updates, and any applicable adjustment factors
Value of data	To be measured
Description of measurement methods and procedures to be applied, inc. frequency:	Project FT Updated minimum every two years.
QA/QC procedures to be applied:	
Any comment:	Thermal efficiency of device was used to calculate an estimate of $P_{p,y}$ for validation and ex ante calculations

Data / Parameter:	$U_{p,y}$
Data unit:	Percentage
Description:	Usage rate in project scenario p during year y

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Source of data to be used:	Own survey of end users
Value of data	To be measured in first year
Description of measurement methods and procedures to be applied, inc. frequency:	Annual usage survey completed for each crediting year
QA/QC procedures to be applied:	Random selection will be controlled by a computer using unique IDs. Locations of stove owners are defined by GPS co-ordinates, as well as address allowing ease of identification. Assumed to be 1 in absence of any data for validation
Any comment:	

Data / Parameter:	$N_{p,y}$
Data unit:	Project technologies credited (units)
Description:	Technologies in the project database for project scenario p through year y
Source of data to be used:	Total sales record
Value of data	Continuous
Description of measurement methods and procedures to be applied, inc. frequency:	Project technologies days will be monitored continuously using an electronic database derived from the sales record
QA/QC procedures to be applied:	Quality of data uploaded will be assured by computer using unique IDs to ensure no duplication of records resulting from human error
Any comment:	

Data / Parameter:	$LE_{p,y}$
Data unit:	t_CO _{2e} per year
Description:	Leakage in project scenario p during year y
Source of data to be used:	Baseline and monitoring surveys
Value of data	0.0228 per stove
Description of measurement methods and procedures to be applied, inc. frequency:	Kitchen Surveys supported by desk-based research.
QA/QC procedures to be applied:	Kitchen Surveys are used and will be carried out by trained staff.
Any comment:	Value stated is to be applied in year one only, no further leakage is anticipated, however this will be reviewed biennially. Value multiplied by number of stoves installed.

B.7.2 Description of the monitoring plan:

>> A. Installation record

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A comprehensive installation record will record the following information in electronic and paper format; the original documentation will be stored in co2balance Ghana office. Paper records will be filled out by stove builder; co2balance Ghana Ltd will supervise and assist stove contractors in generating the appropriate records during the construction phase of the project. (See Annex 4 for further details)

- the date of installation
- GPS location of the installed stove (not on paper)
- The date of the installation of the stove will be used to incorporate a week's lead in time before usage is assumed of the stove to begin. This will ensure a conservative assessment of project technology days and hence overall emission reductions.
- The model of the stove (also indicated on each stove)
- The total number of stoves installed
- Address and telephone number of all stove end users
- Whether the stove will be used for commercial or domestic purposes

B. Project Database

The project database will consist of the Installation record divided according to new project scenarios as and when they occur. The project proponent expects that any improvements to the current design will not involve significant changes in combustion technology or changes in thermal efficiency of +/- 5% and hence will not entail a new project scenario. Any such changes to the current design will however be recorded in the project database. The useful life of the stove technology is estimated to be at least 7 seven years and therefore extends the crediting period chosen of 7 seven years. (See Annex 4 for further details)

C. Ongoing Monitoring

Usage Survey – an annual usage survey determine the drop off rate of the project technology with the assumption that end users fall back to using the baseline technology as indicated in the methodology. As all stoves will be installed within 0.5 years of the start of the crediting period and are expected to last the lifetime of the project, minimum samples of 30 for different aged technologies will not be necessary. Therefore the annual usage survey will be conducted using a minimum sample size of 100.

The usage survey will be conducted by or under the supervision of co2balance Ghana Ltd with guidance on the sampling strategy supplied by co2balance UK Ltd. Paper and electronic copies of the surveys will be retained. (See Annex 4 for further details)

Project KPT (FT) Update

Although the stove remains materially the same each year, an age test will not be applied to the initial project KPT as the project proponent believes this will maintain a more realistic assessment of the project scenario (and also contribute to a conservative result) -. Updated project KPTs will be completed biennially and will be conducted in the same manner (i.e. to capture seasonal variations) as the original project KPTs. The project KPT update will be carried out or supervised by the co2balance Ghana Ltd monitoring team with guidance on the sampling strategy supplied by co2balance UK Ltd. Paper and electronic copies of the surveys will be retained. (See Annex 4 for further details)

Baseline KPT (FT) Update

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A fixed baseline will be adopted by the project proponent following a more seasonally representative baseline KPT conducted during the first year's monitoring period. The KPTs performed during the first year's monitoring period will be carried out or supervised by the co2balance Ghana Ltd monitoring team with guidance on the sampling strategy supplied by co2balance UK Ltd. (See Annex 4 for further details)

Leakage Assessment

As the primary leakage in this project occurs during the manufacture and distribution of the stove, it is not expected to feature during any year other than the first. However the potential for leakage from other sources (e.g. the rebound effect – end users responding to potential reduced expenditure under the project scenario adopt more GHG intensive fuels to supply thermal energy) will be captured by the usage survey completed annually. These surveys will be carried out or supervised by co2balance Ghana Uk Ltd with guidance from co2balance UK Ltd. (See Annex 4 for further details)

Non-renewable Biomass Assessment update

Under the rules of the methodology, the NRB assessment will remain fixed for the entire crediting period, although the project proponent may choose to update the assessment at a later date.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>> The application of the methodology to the project activity to report the baseline was completed on the 8/7/11.

The application of the monitoring was carried out by co2balance UK Ltd. (the project proponent), with support from KPMG Assesores. (independent consultant)

(Project proponent)
co2balance UK Ltd.
1 Discovery House
Cook Way
Bindon Rd.
Taunton TA2 6BJ
+44 (0) 1823 332233
enquiries@co2balance.com

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SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>10/06/2010

C.1.2. Expected operational lifetime of the project activity:

>>

The initial operational lifespan of the improved stoves is expected to be 7 years 0 months, following this a review will be carried out to assess the feasibility of refurbishment in order to achieve another 7 years 0 months of operational life.

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>01/06/2012

C.2.1.2. Length of the first crediting period:

>> 7 years 0 months

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> N/A

C.2.2.2. Length:

>> N/A

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>> Not required

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D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>> Not applicable

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>> Stakeholders were invited personally, by letter, by email and also by a public announcement issued in a local newspaper. The completed PDD will be distributed locally as part of the stakeholder feedback round - in addition to being placed in the public domain via the World Wide Web.

E.2. Summary of the comments received:

>> Many stakeholders highlighted the benefits of the project. Some of these were:

Health

“The project will reduce the health problems associated with cooking” (Feedback Form 26)

“What I like is the health benefits as it will reduce maternal mortality” (Feedback Form 29)

Livelihood of the poor

“It will save our money” (Feedback Form 32)

“Many people will get jobs from this project”

“It reduces poverty” (Feedback form 42)

“It will give me time to do other things” (Feedback Form 48)

Environmental

“It uses less firewood”

“It will look after soil erosion” (Feedback form 28)

“It is going to reduce CO2 in the environment” (Feedback form 31)

Name	Susana. A. Boye
What is your impression of the meeting?	“It was impressive and educative”
What do you like about the project?	“It will solve the social problems, environmental and economic problems”
What do you not like about the project?	“Everything is ok”
Signature	Feedback Form 3

Name	Nicholas Downing
What is your impression of the meeting?	“It will help us stop cutting down so many trees and have our environment clean”

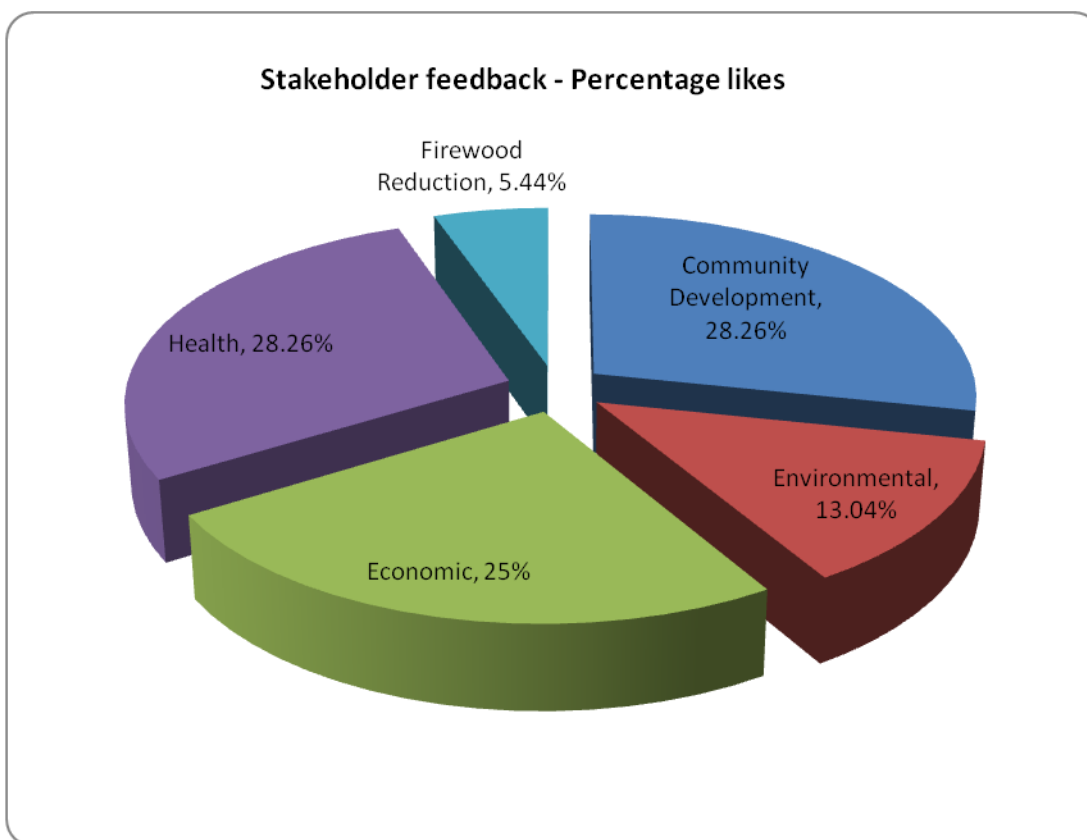
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What do you like about the project?	“It will help our wives”
What do you not like about the project?	“I like the project very much”
Signature	Feedback Form 6

Name	Grace Riche
What is your impression of the meeting?	“To learn about the benefits of this type of stove and to get some for my household”
What do you like about the project?	“Very beneficial to us, because it will give us good health since no smoke will come out and destroy our eyes and attack our lungs”
What do you not like about the project?	“The only thing is when you move from one house to another you cannot move it to the new place”
Signature	Feedback Form 10

Name	Olivia Adjetej
What is your impression of the meeting?	“Very important”
What do you like about the project?	“I like the demonstration and the drama”
What do you not like about the project?	“I like everything it is perfect”
Signature	Feedback Form 18

Name	Samuel Anum
What is your impression of the meeting?	“Very impressive and well attended especially am impressed with how Bushra (co2balance) goes about her facilitation”
What do you like about the project?	“Very economical. Less time (spent cooking) and reliable”
What do you not like about the project?	“nothing”
Signature	Feedback Form 5

**E.3. Report on how due account was taken of any comments received:**

>>94 % of the Feedback received from the Evaluation Forms was entirely positive. The Negative feedback was assessed and it was established that these were not “true negatives” as they related to the mobility of the stove - an issue that cannot be significantly altered because of the requirement for our monitoring teams to easily locate the stove to measure emissions reductions.

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Annex 1**CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

Organization:	co2balance
Street/P.O.Box:	Cook Way
Building:	1 Discovery House
City:	Taunton
State/Region:	Somerset
Postfix/ZIP:	TA2 6BJ
Country:	UK
Telephone:	+44 (0)1823 33 22 33
FAX:	+44 (0)1823 33 67 76
E-Mail:	enquiries@co2balance.com
URL:	www.co2balance.com
Represented by:	Richard Iliffe
Title:	Regional Co-ordinator
Salutation:	Mr
Last Name:	Iliffe
Middle Name:	Barry
First Name:	Richard
Department:	Projects
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	richard.iliffe@co2balance.com

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Please refer to the Passport document to see proof letter.

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Annex 3

BASELINE INFORMATION

I. SEE SUPPLEMENTARY FILES FOR THE NRB STUDY.

See supplementary files for baseline report.

Annex 4

MONITORING INFORMATION

See Passport document.